

5: CORRELATIONS

Often a fieldwork exercise aims to relate factors and show that each varies either positively or negatively with the other. For example, it can be shown that the wind-speed increases and temperatures drop as we climb uphill. Clearly there is some relationship here, but how strong is it? A correlation coefficient will measure the strength of any observed relationship.

The simplest way to illustrate a relationship between two variables is first to construct a scattergraph and then to draw a 'line of best fit' through these points. The resulting graph may look like one of the examples in Figure 5.1.

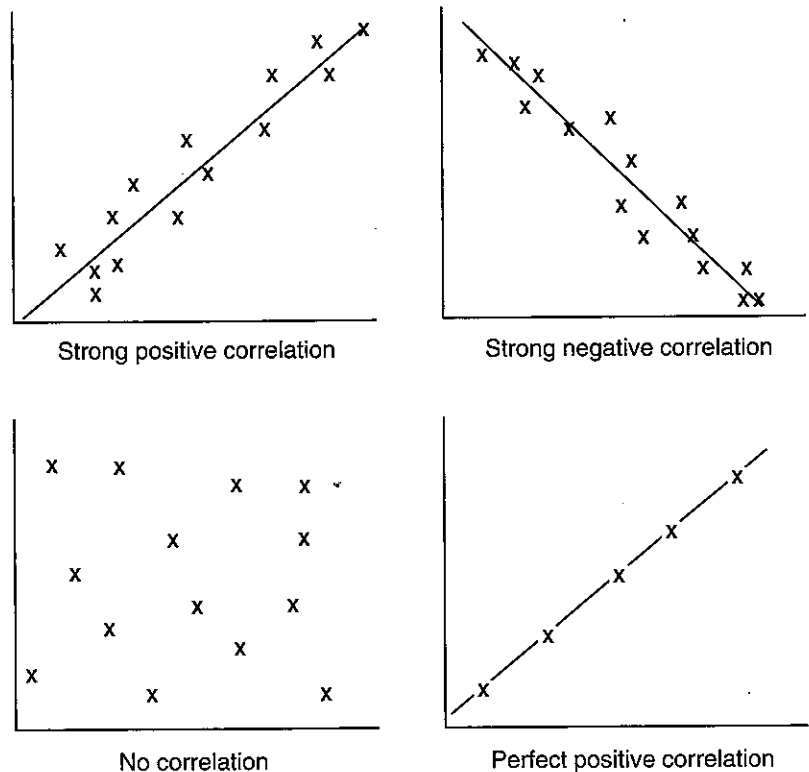


Figure 5.1: Various forms of scattergraphs

The scattergraph will illustrate possible relationships but it will not give an indication of the strength of the relationship. For this we must use a **correlation coefficient** (r). The value of r lies between -1 and $+1$. The minus sign indicates a negative relationship, and the nearer to -1 the stronger the negative correlation. Similarly, positive values indicate a positive relationship, and once again the nearer to $+1$ the stronger the positive correlation.

A positive relationship means that as variable X increases so does variable Y . A negative relationship indicates that as one variable increases the other decreases.

Two correlation coefficients will be described here: the Spearman Rank Correlation Coefficient, which uses data according to its rank order, and the Product-Moment Correlation Coefficient, which uses the actual values of the data.